

FINAL
PHASE III RI

VOLUME II
APPENDIX A

DRAKE CHEMICAL SITE
LOCK HAVEN, PENNSYLVANIA

AUGUST 1988
W.A. NO. 123-3L31

AUGUST 1988

FINAL
PHASE III RI

VOLUME II
APPENDIX A

DRAKE CHEMICAL SITE
LOCK HAVEN, PENNSYLVANIA

EPA WORK ASSIGNMENT NUMBER 123-3L31
UNDER
CONTRACT NUMBER 68-01-7250

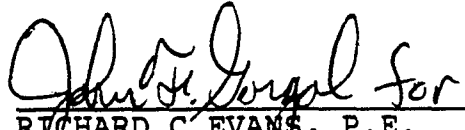
PREPARED BY:
NUS CORPORATION
PITTSBURGH, PENNSYLVANIA

APPROVED BY:
EBASCO SERVICES INCORPORATED
LANGHORNE, PENNSYLVANIA

PREPARED BY:


DENNIS SMITH
SITE MANAGER
NUS CORPORATION

APPROVED BY:


RICHARD C. EVANS, P.E.
REGIONAL MANAGER, REGION III
EBASCO SERVICES INCORPORATED

AR302195

TABLE OF CONTENTS

VOLUME II APPENDIX A - FIGURES

<u>FIGURE</u>	<u>TITLE</u>
A.1-1	Site Location
A.3-1	Test Pit Cross Section Locations
A.3-2	Phase III Monitoring Well Locations
A.3-3	Test Pit Cross Sections 1-1'
A.3-4	Test Pit Cross Sections 2-2'
A.3-5	Test Pit Cross Sections 3-3'
A.3-6	Test Pit Cross Sections 4-4'
A.3-7	Test Pit Cross Sections 5-5'
A.3-8	Test Pit Cross Sections 6-6'
A.3-9	Test Pit Cross Sections 7-7'
A.3-10	Bedrock Surface Contour Map
A.3-11	Map of Bedrock Lithology and Cross Section Location
A.3-12	Cross Section E-E'
A.3-13	Cross Section F-F'
A.3-14	Potentiometric Surface Map - Bedrock Wells
A.3-15	Potentiometric Surface Map - Bedrock Wells
A.4-1	Sampling Results - Surface Waters
A.4-2	Sampling Results - Sediments
A.4-3	Sampling Results - Soils, VOAs and Phenolic (Level II)
A.4-4	Sampling Results - Soils, Fixed Base Laboratory (Level III)
A.4-5	Sampling Results - Groundwater, Volatiles
A.4-6	Sampling Results - Groundwater, BNAs, Pesticide/PCBs
A.4-7	Sampling Results - Fenac, 8-Naphthylamine and Cyanide
A.4-8	Sampling Results - Groundwater, Total Metals
A.4-9	Sampling Results - Groundwater, Dissolved Metals
A.5-1	Conceptual Contaminant Migration Model
A.5-2	Isoconcentration Map for 1,2-Dichloroethane
A.5-3	Isoconcentration Map for Chlorobenzene
A.5-4	Isoconcentration Map for Fenac
A.5-5	Isoconcentration Map for Cadmium
A.5-6	Isoconcentration Map for Chromium
A.5-7	Modeling Grid Arrangement
A.5-8	Modeling Calibration
A.5-9	Modeling Results
A.5-10	Modeling Results - Zone 1: Central
A.5-11	Modeling Results - Zone 2, Southwest
A.5-12	Modeling Results - Zone 2, Northeast
A.5-13	Modeling Results - Zone 3, Southwest
A.5-14	Modeling Results - Zone 3, Southeast
A.5-15	Modeling Results - Bald Eagle Creek

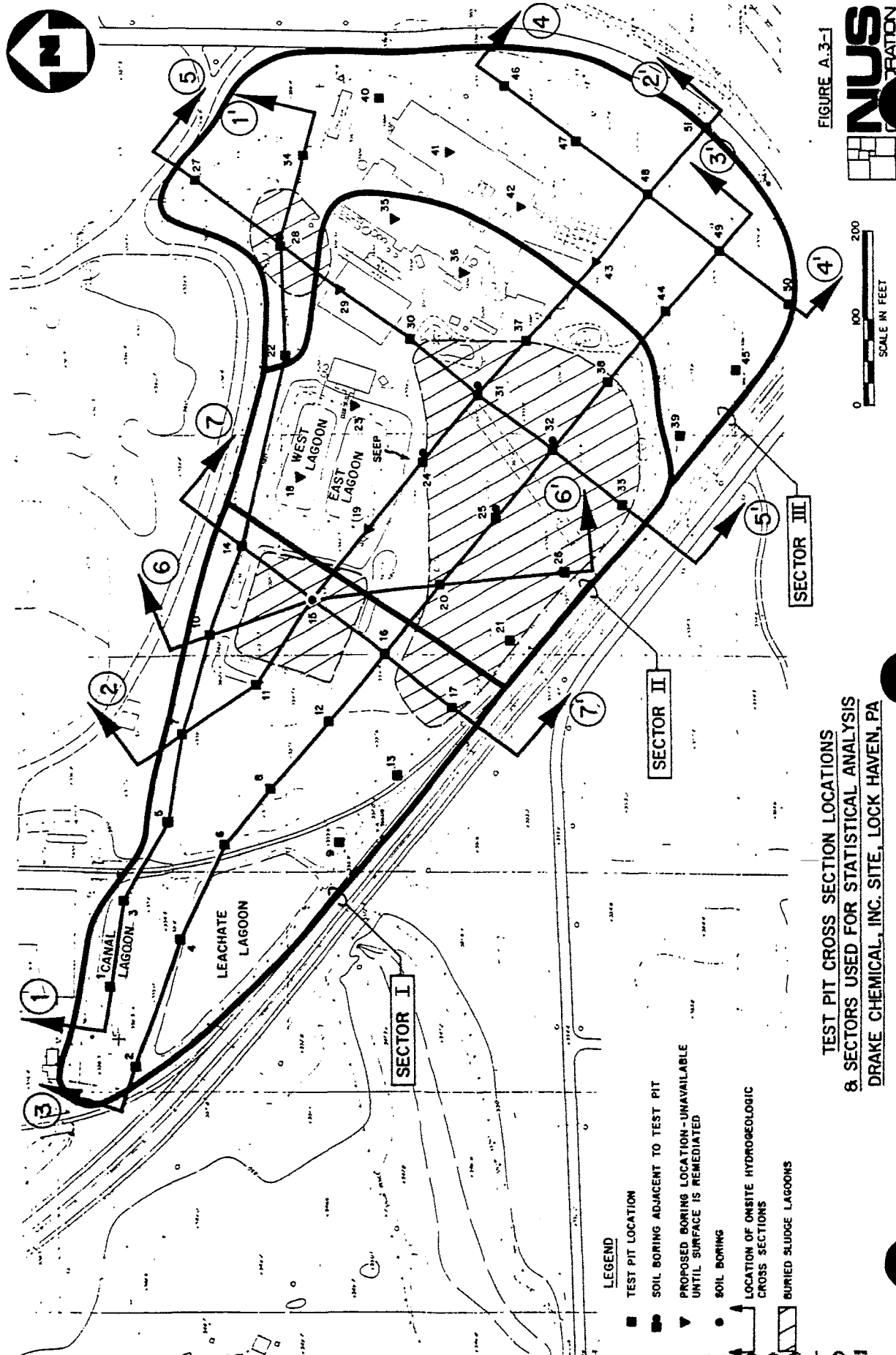


FIGURE A.3-1



AR302197

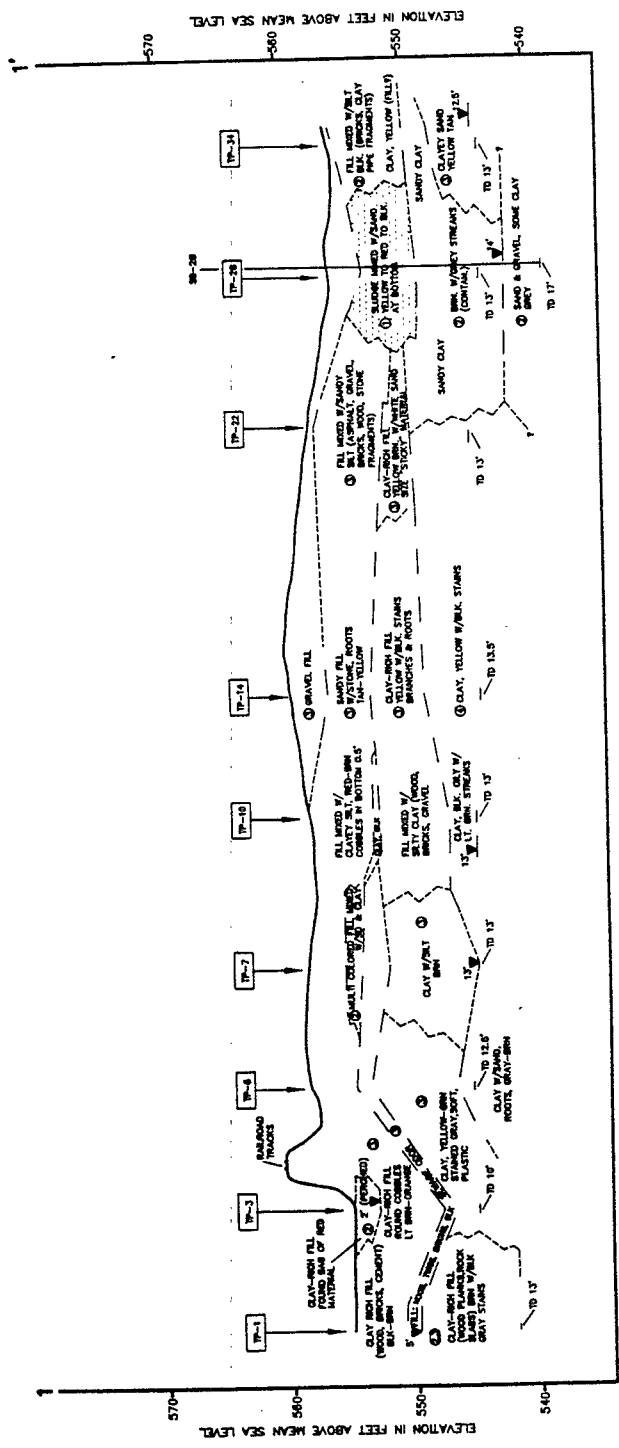
UNSCANNED ITEM(S)

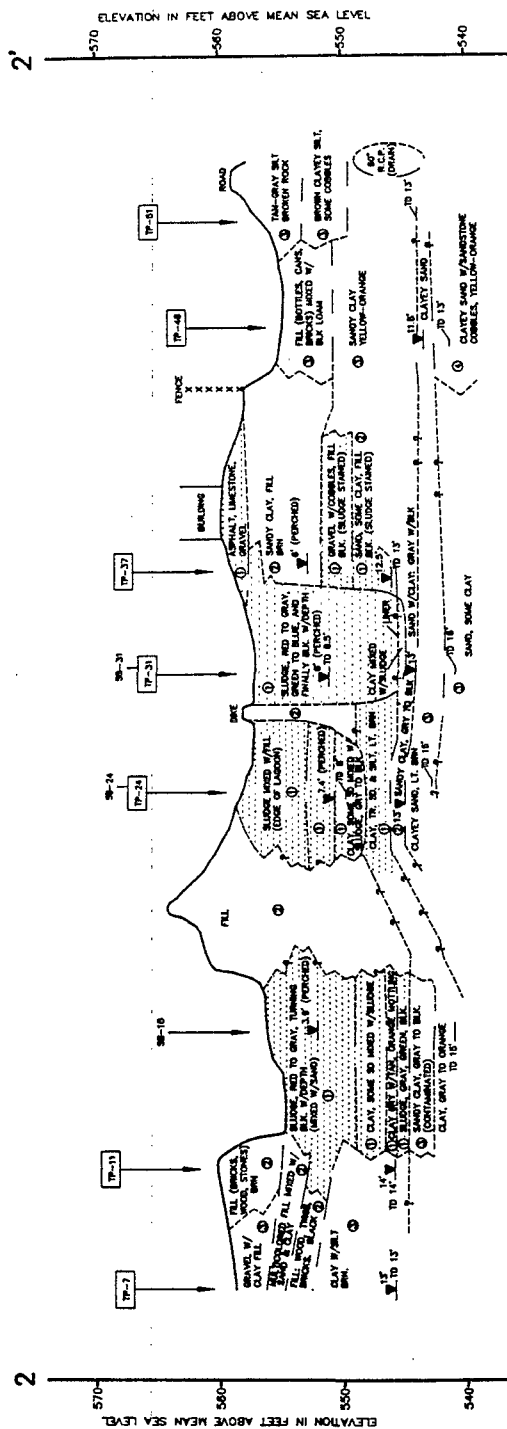
ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

AR302199





LEGEND

----- APPROXIMATE BOUNDARY

KEY

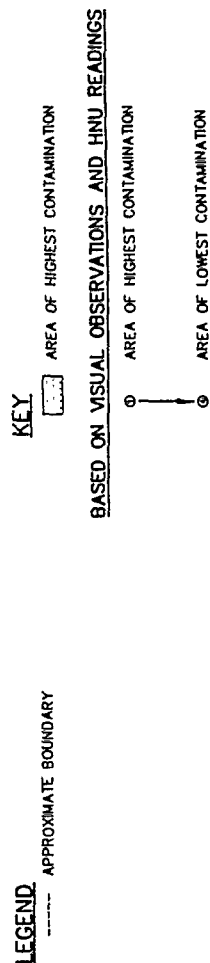
■ AREA OF HIGHEST CONTAMINATION

○ AREA OF HIGHEST CONTAMINATION

○ AREA OF LOWEST CONTAMINATION

BASED ON VISUAL OBSERVATIONS AND HNU READINGS

HYDROGEOLOGIC CROSS SECTION 2-2'
DRAKE CHEMICAL SITE
LOCK HAVEN, PA

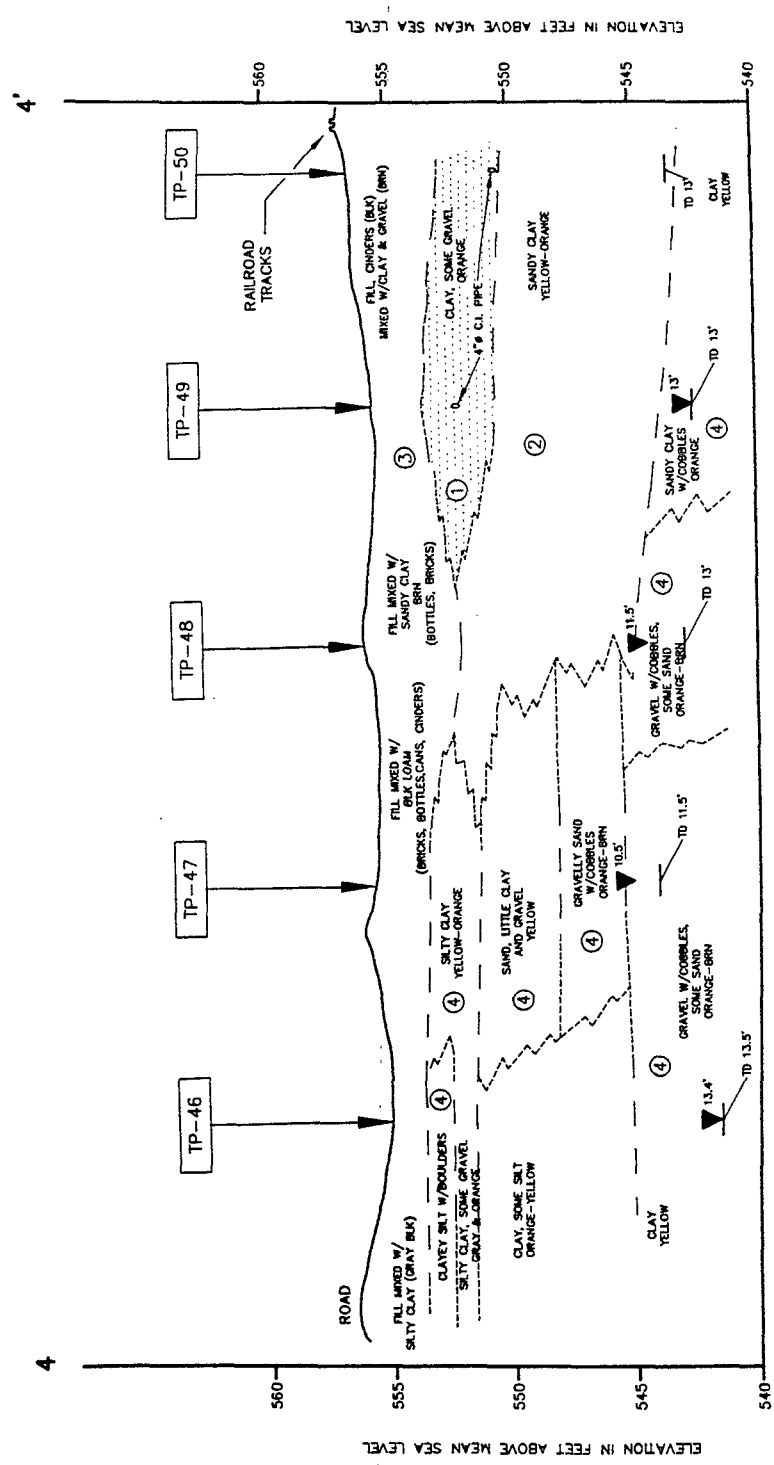


HYDROGEOLOGIC CROSS SECTION 3-3'
DRAKE CHEMICAL SITE
LOCKPORT, PA

FIGURE A.3-5



HORIZONTAL SCALE IN FEET



LEGEND

--- APPROXIMATE BOUNDARY

— AREA OF HIGHEST CONTAMINATION

— AREA OF LOWEST CONTAMINATION

KEY

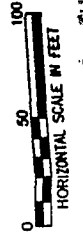
— AREA OF HIGHEST CONTAMINATION

— AREA OF LOWEST CONTAMINATION

BASED ON VISUAL OBSERVATIONS AND HNU READINGS

HYDROGEOLOGIC CROSS SECTION 4-4'
 DRAKE CHEMICAL SITE
 LOCK HAVEN, PA

FIGURE A.3-6



AR302202

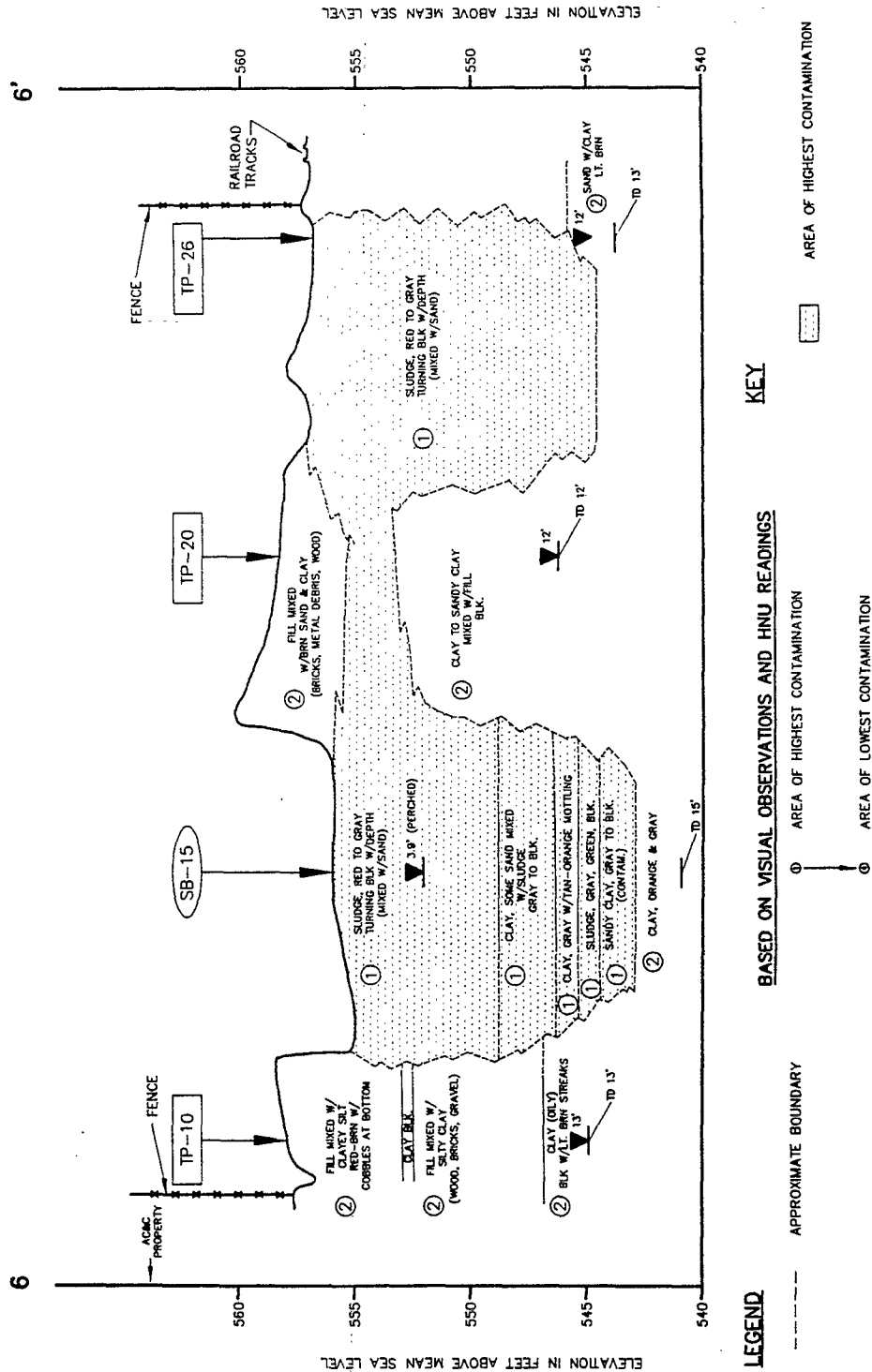
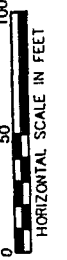
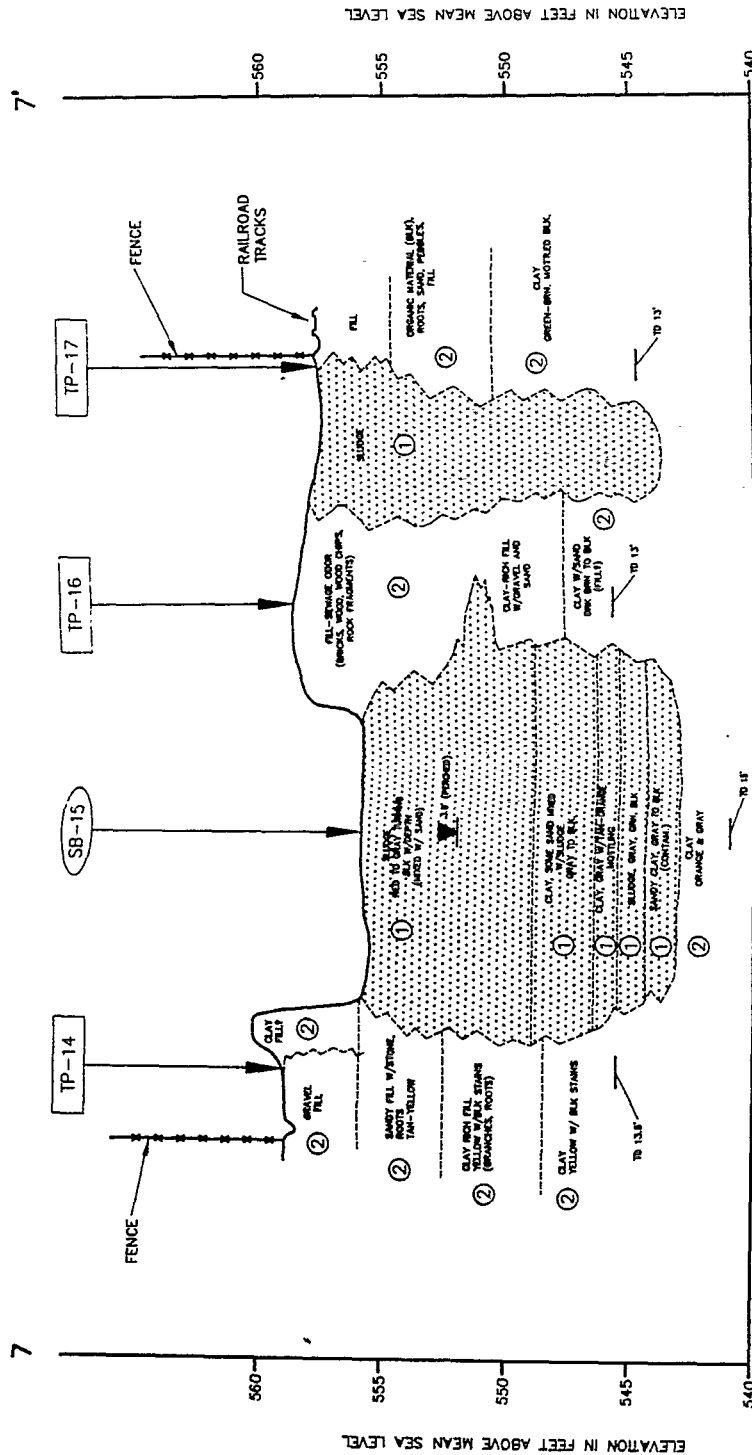


FIGURE A.3-8
 DRAKE CHEMICAL SITE
 LOCK HAVEN, PA





UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

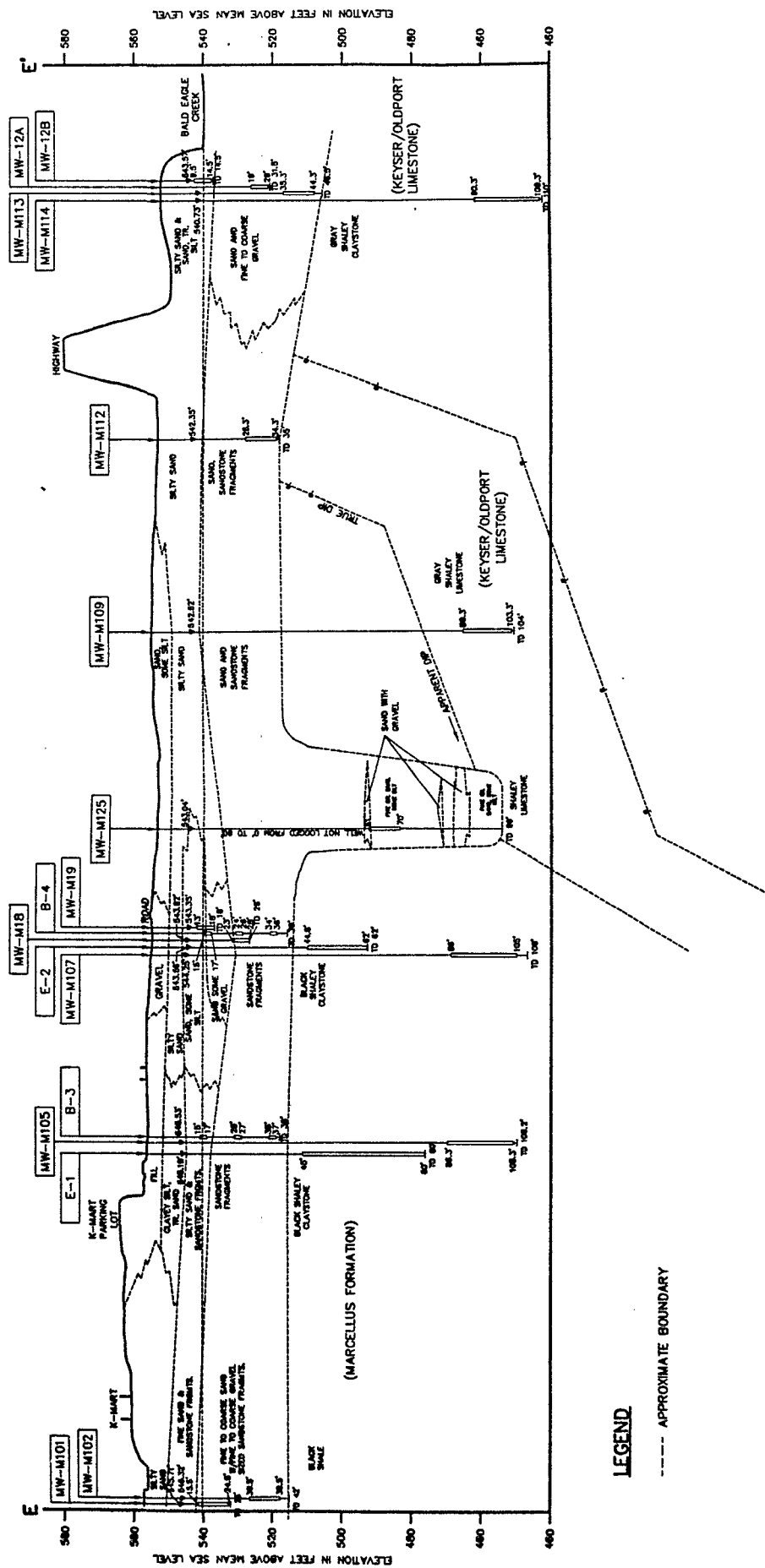


FIGURE A.3-12

HYDROGEOLOGIC CROSS SECTION E - E'
DRAKE CHEMICAL SITE
LOCK HAVEN, PA



NUS
CORPORATION

NOTE: 670V1A9205\055 MAR

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

FIGURE A.3-13

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

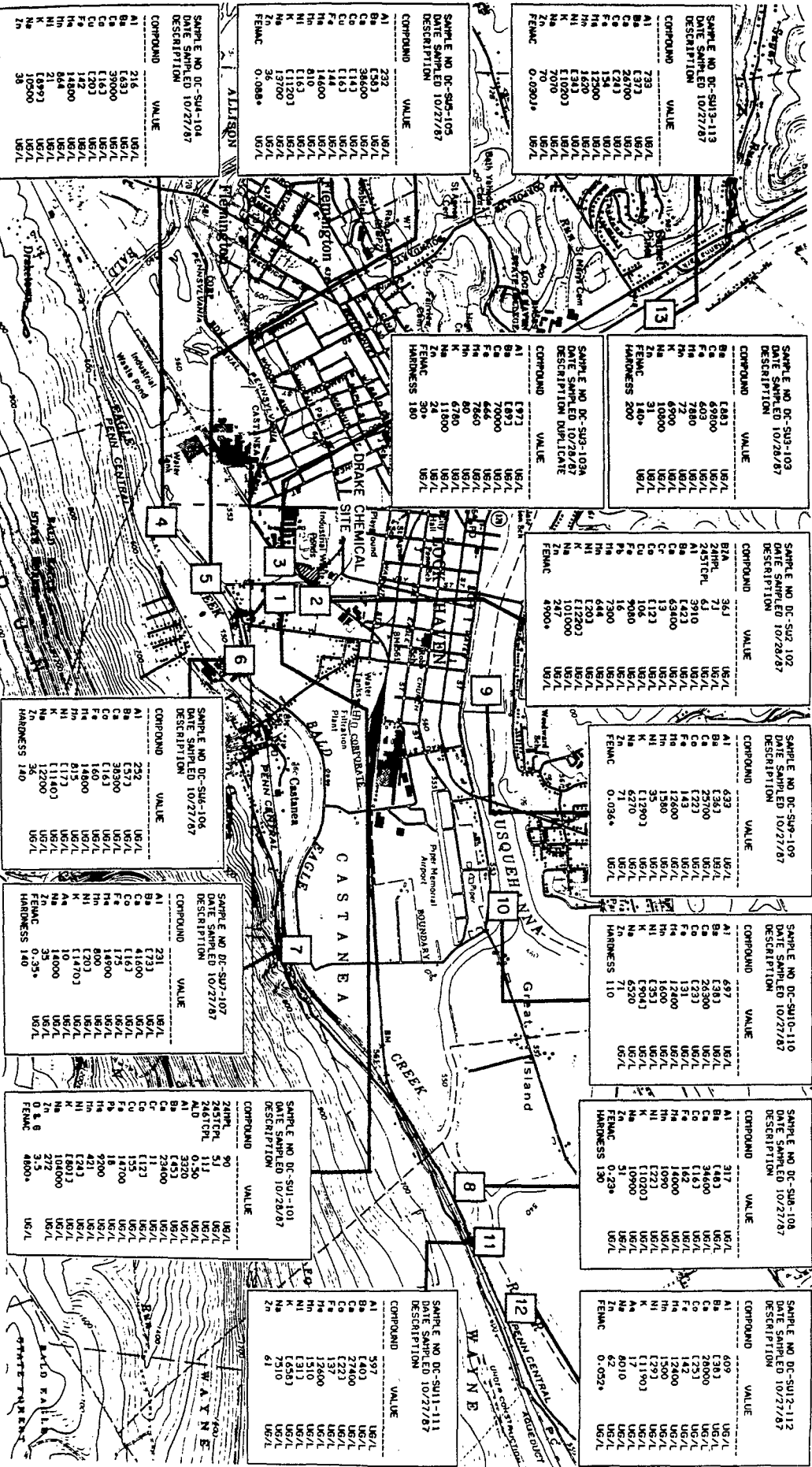
ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

AR302212

NOTE: SAMPLES 1 & 2 TAKEN FROM LEAST & WEST ON-SITE WASTE PONDS
 SAMPLE 3 TAKEN FROM SOUTHERN ON-SITE WASTE POND
 FOR DETAILED SITE FEATURES SEE FIGURE A.3-1.



SAMPLING RESULTS - SURFACE WATER
 DRAKE CHEMICAL, INC. SITE, LOCK HAVEN, PA.



FIGURE A.4-1

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

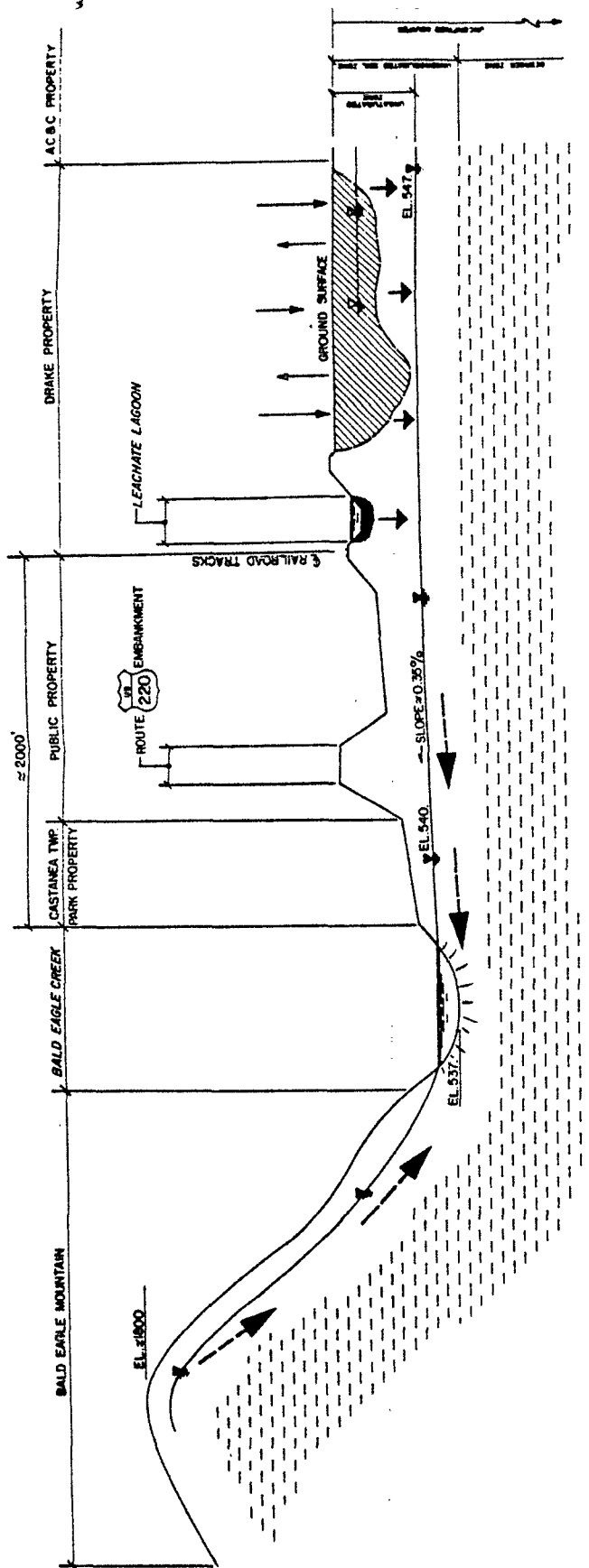
PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)



BURIED WASTE (SOIL AND SLUDGE)



CONTAMINATED SEDIMENT



FRACTURED BEDROCK



WATER TABLE



RANDOM PERCHED WATER TABLE



VOLATILIZATION



INFILTRATION = 16 INCHES/YEAR
(ANNUAL PRECIPITATION = 42.5 IN)



LEACHATE



GROUNDWATER FLOW DIRECTION

- VELOCITY IN OVERBURDEN = 60/YR
- VELOCITY IN BEDROCK = 6/YR

PROCESSES POSSIBLE IN CONTAMINANT MIGRATION

- ADVECTION (IE CARRIED WITH GROUNDWATER FLOW)
- DISPERSION DUE TO MECHANICAL MIXING
- DIFFUSION
- RETARDATION
- BIODEGRADATION
- ADSORPTION
- CATION EXCHANGE

FIGURE A.5-1



CONCEPTUAL CONTAMINANT MIGRATION MODEL
 DRAKE CHEMICAL SITE, LOCK HAVEN, PA
 NOT TO SCALE, NOT FOR COMPUTATIONS, PICTORIAL ONLY

AR302221

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

UNSCANNED ITEM(S)

ONE OR MORE OF THE FOLLOWING ITEMS MAY BE ASSOCIATED
WITH THIS DOCUMENT:

PHOTOGRAPHS
DRAWINGS
OVERSIZED MAPS
ROLLED MAPS

PLEASE CONTACT THE CERCLA RECORDS CENTER TO VIEW THE
ITEM(S)

CLBZ & 1,2DCA vs TIME, X,Y=(4,6)

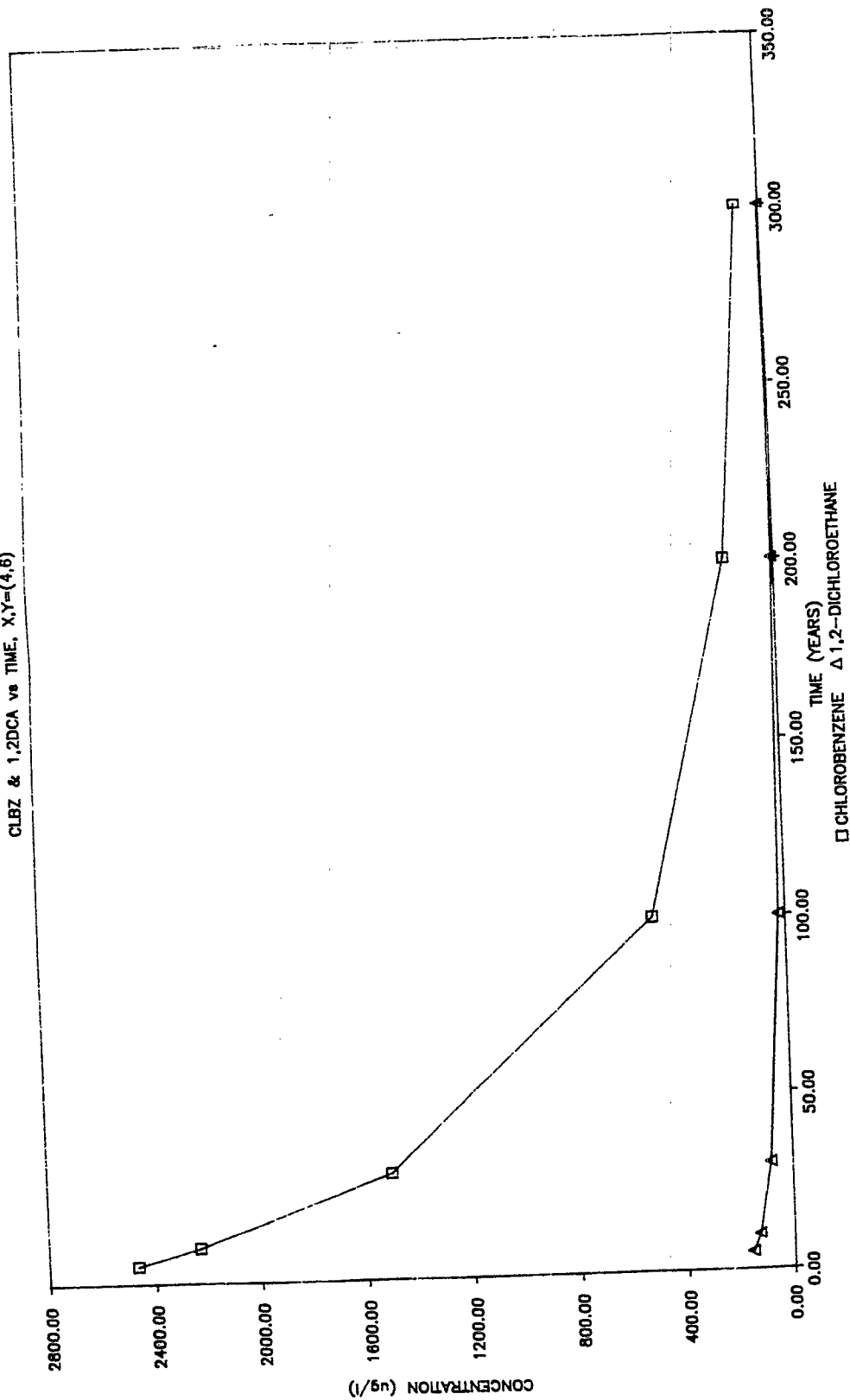
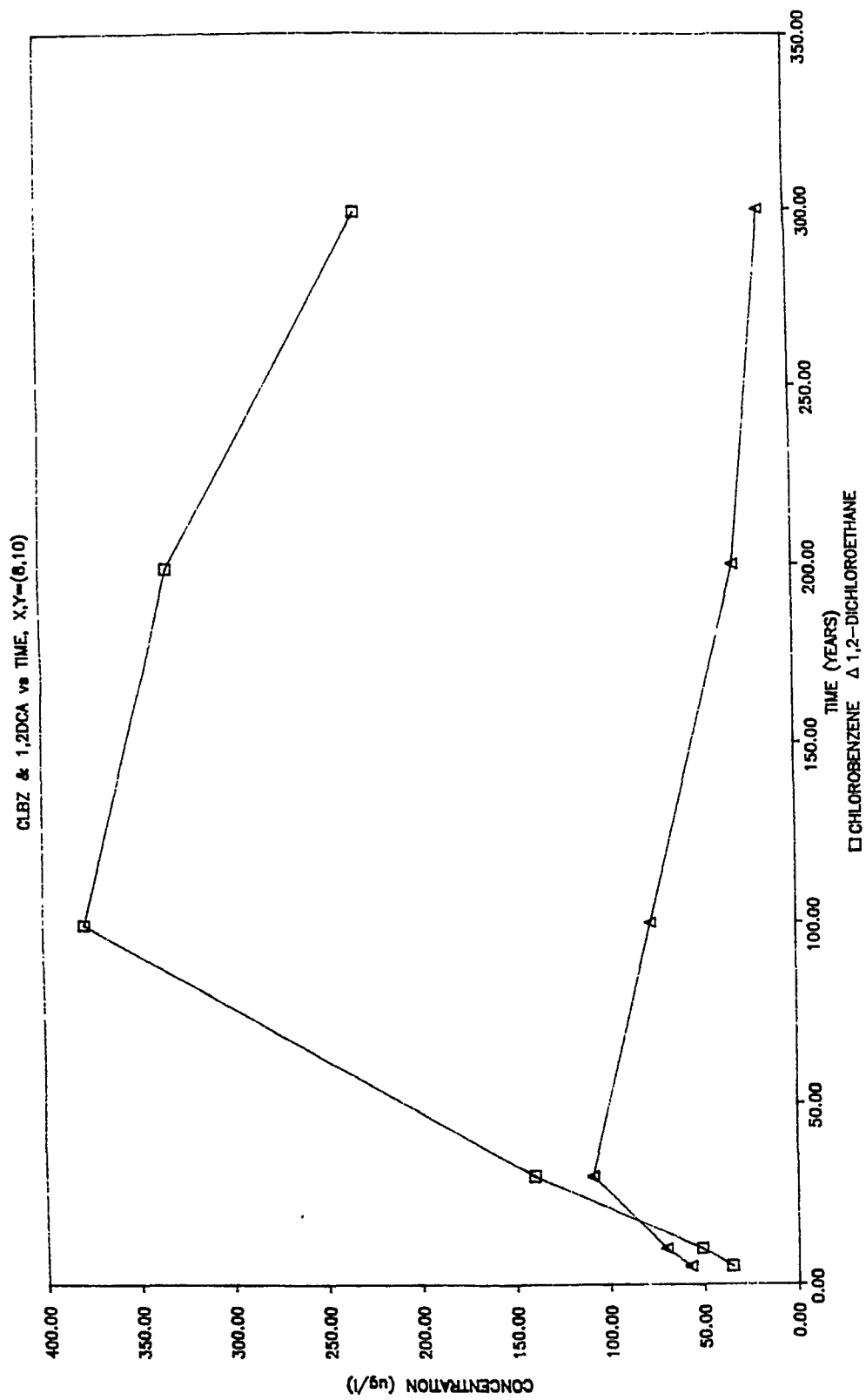


FIGURE A.5-10

SIMULATION RESULTS - ZONE 1 CENTRAL
DRAKE CHEMICAL SITE
LOCK HAVEN, PA



AR302230

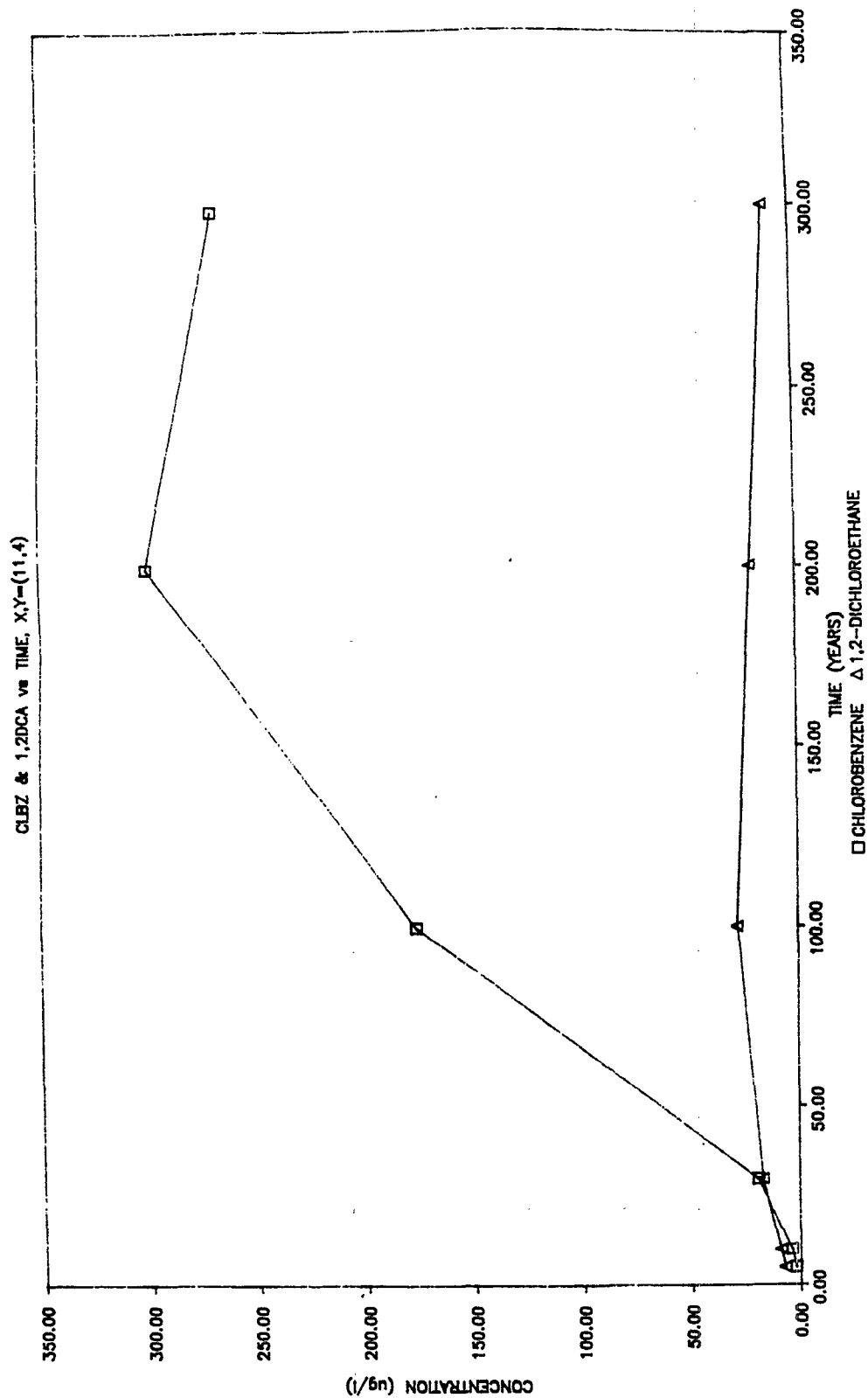


SIMULATION RESULTS - ZONE 2 SOUTHWEST
DRAKE CHEMICAL SITE
LOCK HAVEN, PA

FIGURE A.5-11



AR302231

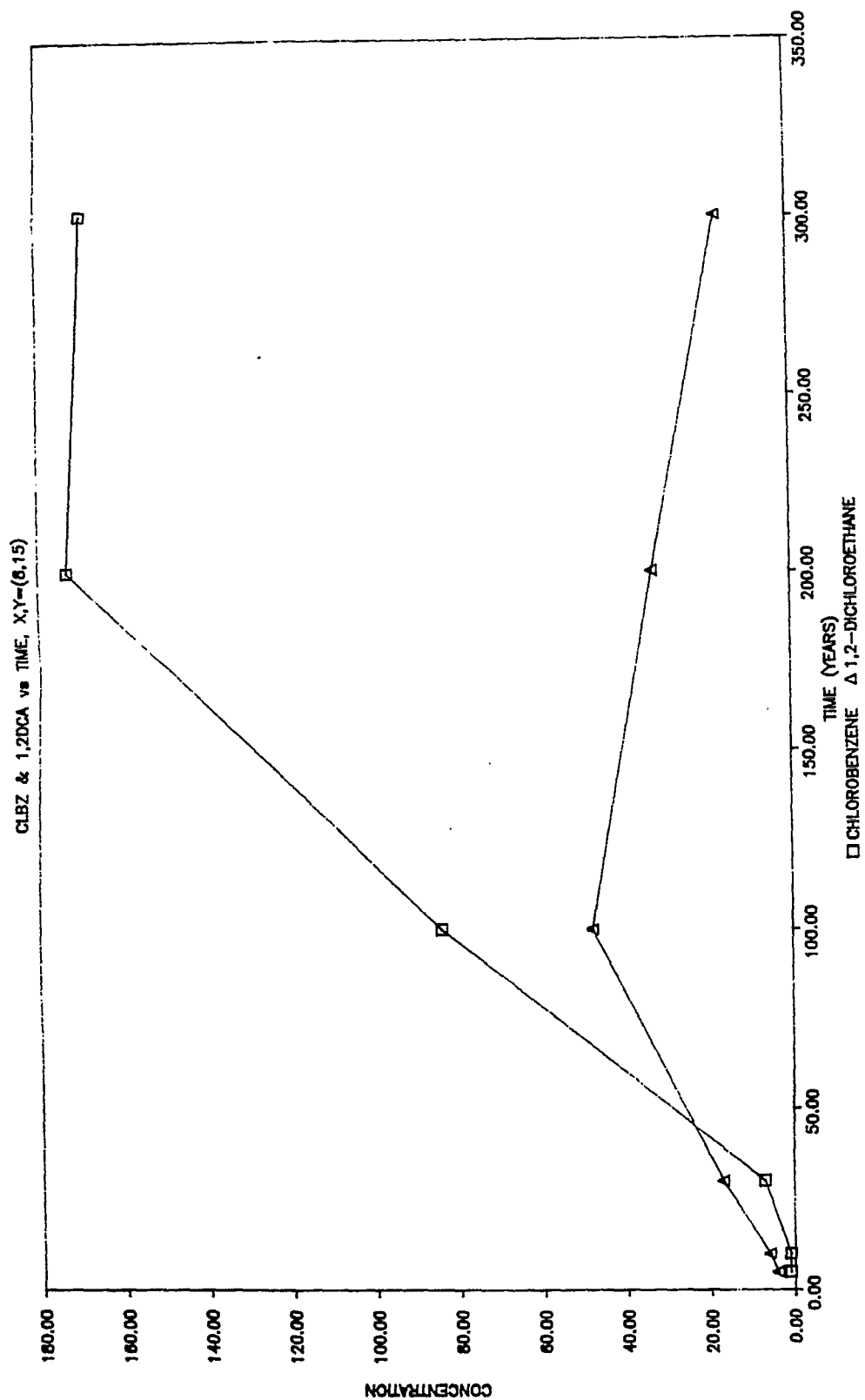


SIMULATION RESULTS - ZONE 2 NORTHEAST
DRAKE CHEMICAL SITE
LOCK HAVEN, PA

FIGURE A5-12



AR302232

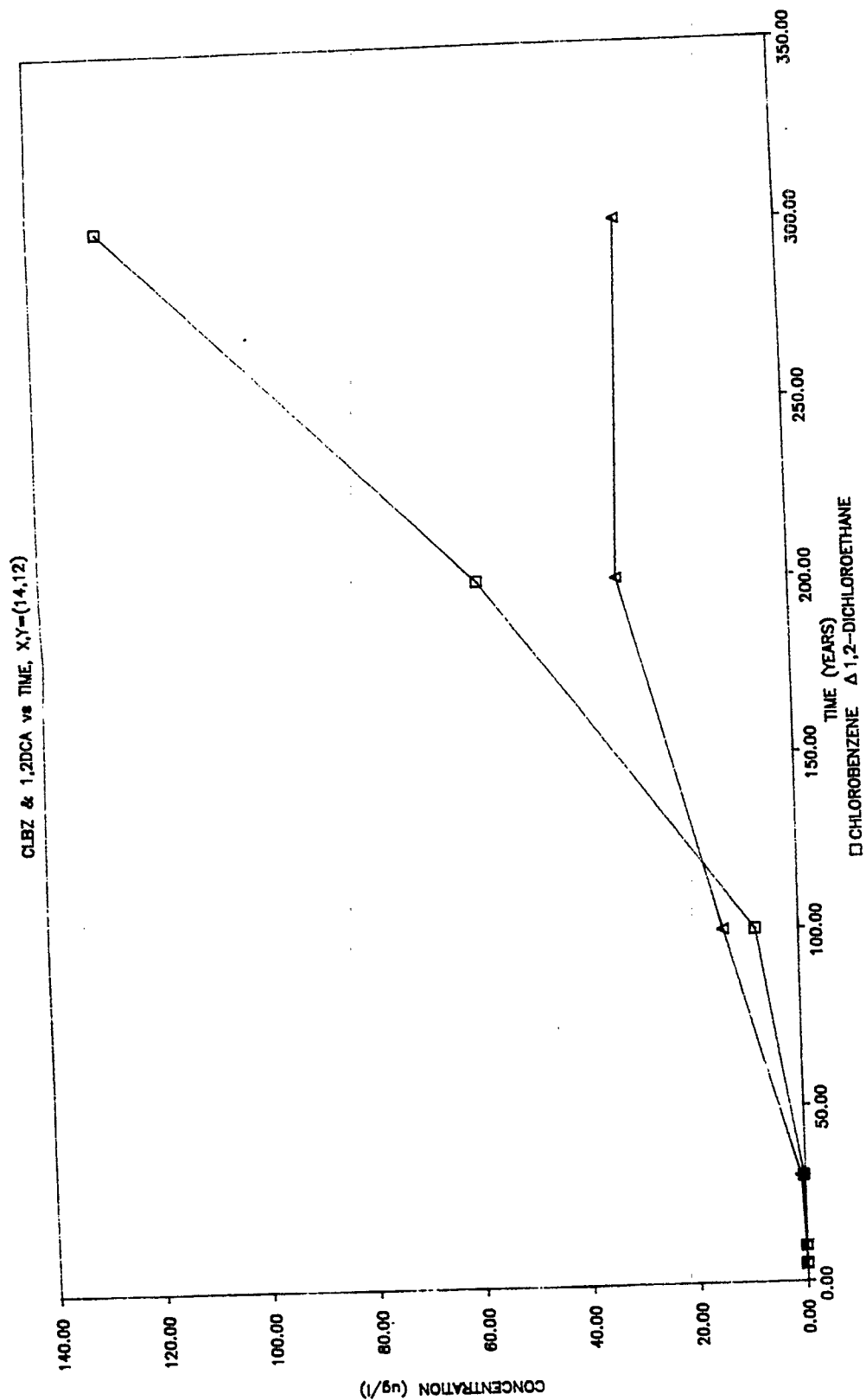


SIMULATION RESULTS - ZONE 3 SOUTHWEST
 DRAKE CHEMICAL SITE
 LOCK HAVEN, PA

FIGURE A.5-13



AR302233

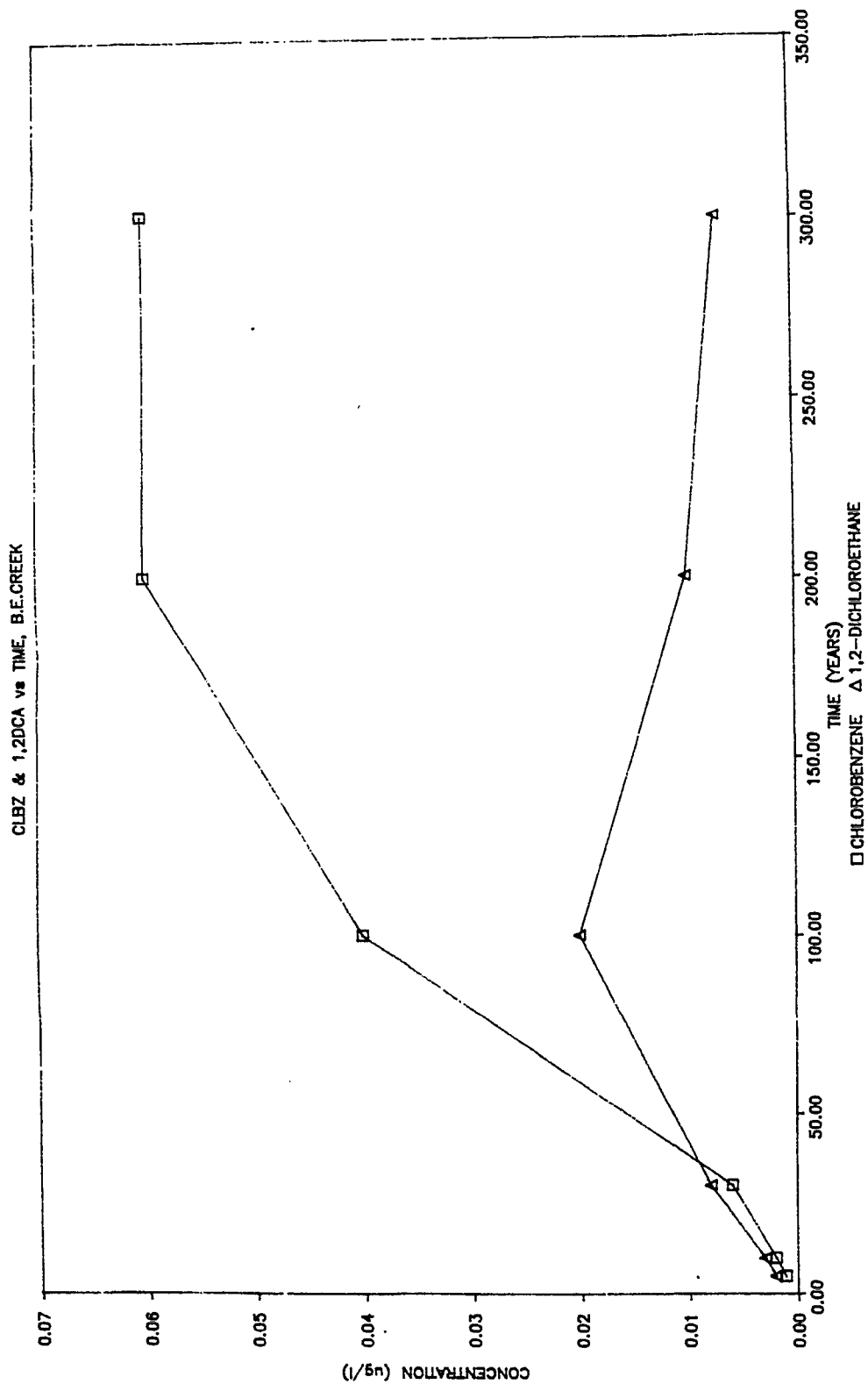


SIMULATION RESULTS - ZONE 3 SOUTHEAST
DRAKE CHEMICAL SITE
LOCK HAVEN, PA

FIGURE A.5-14



AR302234



SIMULATION RESULTS - BALD EAGLE CREEK, AT CASTANEA BRIDGE

LOCK HAVEN, PA

FIGURE A.5-15



AR302235